

REMARKS/ARGUMENTS

Reconsideration and allowance of the subject application in view of the above amendments and remarks is respectfully requested.

Claims 1, 2, 4, 6, 8-13 and 15-23 currently remain under consideration in this application, claims 3, 5, and 7 having been canceled without prejudice or disclaimer. Claims 14 and 24-34 have been withdrawn from consideration over applicants' traverse as being the subject of a restriction requirement.

The rejection of claims 1-5 and 15 under 35 U.S.C. §102(e) as being anticipated by Bradford Ritter (U.S. PG Pub 2002/0030681) is respectfully traversed.

Ritter ('681) is directed toward a method of calculating texture coordinate *gradient vectors*, which is not the same as the computation of texture coordinate *displacement values* for implementing emboss-style bump mapping as set forth by applicants' claims. Ritter relies on a technique of parametric texture mapping (PTM) which utilizes "texels" whose overall brightness (or whose individual RGB chromaticity values) are computed according to a predetermined parametric function which may comprise as many as six coefficients for each RGB color channel. (e.g., see Ritter ('681) at page 3, paragraphs 24-30). "In a traditional RGB texture, a texel is an RGB component. In PTM, texels generally are more complex data structures which contain lighting information." (Ritter ('681) at page 3, paragraph 26.) Ritter's approach to bump mapping is completely different from that set forth by applicants' claims and patent specification—which teaches use of a conventional RGB texture and performs an emboss-style of bump mapping by subtracting an offset texture from a specified texture on a per pixel basis.

Ritter ('681) does not teach or disclose performing embossed-style bump mapping or using circuitry within the graphics pipeline to compute texture coordinate displacements for use in providing an embossing or embossed texture effect as set forth by applicants' claims 1-5 and 15 as presently amended. Moreover, although Ritter mentions (at paragraph 32) that a PTM (parametric texture map) may be parameterized using independent variables representing light direction and that such may be

determined as the dot product of the light and tangent vectors, Ritter does not teach or disclose a vector processing unit in a vertex transformation and lighting processing portion of the graphics processing system for computing dot products and light-to-vertex direction vectors for use in creating an embossed texture effect.

Consequently, the Ritter ('681) Patent Application Publication does not anticipate claims 1-5 and 15 because it does not disclose every element of the invention as set forth in these claims. See *Lewmar Marine, Inc. v. Barient, Inc.*, 3 U.S.P.Q. 2d 1766 (Fed. Cir. 1987).

The rejection of claims 6-9 and 12-13 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent 6,163,319 to Peercy et al. is respectfully traversed.

Peercy ('319) specifically requires the use of a perturbed Normal texture map N' to perform bump mapping (see col. 15, lines 40 et seq.). In contrast, applicants' claims are directed toward a method of providing embossed-style bump mapping effects based on texture coordinate displacements that do not require the use of a perturbed Normal texture map. Indeed, one advantage of applicants approach is that use of the Normal vector (either "perturbed" or not) is avoided entirely. Texture coordinates offsets are computed based solely on a light position vector and the Tangent and Binormal vectors by using dedicated hardware circuitry incorporated into the transform and lighting processing portion of the graphics system. Peercy ('319) does not teach or disclose "hardware circuitry within a graphics system to compute texture offset coordinates per vertex based on eye-space binormals and light direction information..." as set forth by applicants' claims 6-9 as presently amended. Moreover, Peercy ('319) does not teach or disclose "texture coordinate displacement computation circuitry ... included within the graphics pipeline vertex transformation and lighting circuitry" as set forth by applicants' claim 12 or "performing a texture coordinate displacement computation using hardware within the [graphics] pipeline" as set forth by applicants' claim 13 as presently amended.

Consequently, the Peercy ('319) patent does not anticipate claims 6-9 and 12-13 because it does not disclose every element of the invention as set forth in these claims. See *Lewmar Marine, Inc. v. Barient, Inc.*, 3 U.S.P.Q. 2d 1766 (Fed. Cir. 1987).

The rejection of claim 10 under 35 U.S.C. §103(a) as being unpatentable over Peercy et al. (U.S. Patent 6,163,319) is respectfully traversed for at least the same reasons as recited above with respect to claims 6-9 and 12-13. Peercy et al. ('319) do not teach or suggest the elements recited in claim 6 as amended for at least the reasons set forth above, and claim 10 is dependent on claim 6.

The rejection of claims 16, 17-21 and 23 under 35 U.S.C. §103(a) as being unpatentable over Peercy et al. (U.S. Patent 6,163,319) in view of Montrym et al. (U.S. Patent 6,452,595) is respectfully traversed. Neither Peercy et al. ('319) nor Montrym et al. ('595), considered alone or together, disclose or suggest vertex transformation and lighting processing hardware in a graphics processing system which comprises circuitry for efficiently performing emboss-style bump mapping as set forth in applicant's independent claims 16 or 20 for at least the same reasons as discussed above with respect to claim 6. Peercy et al. ('319) performs bump mapping using a perturbed Normal texture map and does not teach or suggest performing emboss-style bump mapping or using specific dedicated circuitry in the transformation and lighting unit to efficiently perform emboss-style bump mapping using Tangent and Binormal vectors as set forth in applicants' independent claims 16 and 20.

Montrym ('595) is directed toward the implementation of an antialiasing feature in a graphics pipeline and discloses a lighting logic unit that implements an equation used to approximate a specular lighting term ('595 specification at col. 23, lines 51-53) and does not teach or suggest the performing of emboss-style bump mapping or providing of circuitry in the lighting logic unit for efficiently accomplishing emboss-style bump mapping. Consequently, applicants respectfully contend that neither Peercy et al. ('319) nor Montrym et al. ('595), considered either alone or together, disclose or suggest vertex transformation and lighting processing hardware in a graphics processing system which comprises circuitry for efficiently performing emboss-style bump mapping as set forth in applicant's independent claims 16 and 20 or the claims dependent upon those claims.

DEMERS et al.
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In view of the applicant's foregoing amendments and remarks, it is believed that the application is in condition for allowance. Favorable consideration and prompt allowance of this application are respectfully solicited.

Request for Interview with the Examiner -

If the Examiner has any further questions or concerns pertaining to the patentability of applicant's method and apparatus for performing efficient generation of texture coordinate displacements for implementing emboss-style bump mapping in a graphics rendering system as set forth in the claims or as disclosed in the specification, he is respectfully requested to contact the undersigned at the telephone number listed below to set up a time and date for the purpose of allowing the undersigned to conduct an interview with the Examiner, either in person or via telephone.

If any small matter remains outstanding, the Examiner is encouraged to telephone applicant's representative at the telephone number listed below.

Respectfully submitted,

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